

AP Chemistry Chapter 9

Supplemental Worksheet

Name: _____ Date: _____ Period: _____

1. Which of the following ions have noble-gas electron configurations? What are the electron configurations of the ions that do not?

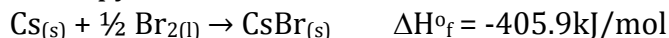
- a. Cr^{3+} b. Sc^{3+} c. Zn^{2+} d. Te^{2-} e. Zr^{4+} f. Cu^{+}

2. Use Lewis symbols to represent the following ionic compounds.

- a. KI b. barium fluoride c. Rb_2S d. aluminum oxide

3. The lattice energy of sodium fluoride is -914kJ/mol NaF. Determine the enthalpy of formation of $\text{NaF}_{(s)}$. Compare your result with the published value of -573.7 kJ/mol .

4. The enthalpy of formation of cesium bromide is



The enthalpy of sublimation of cesium is 76.1kJ/mol , and the enthalpy of vaporization of liquid bromine is $\text{Br}_{2(l)} \rightarrow \text{Br}_{2(g)} \quad \Delta H^\circ = 30.9\text{kJ/mol}$

Calculate the lattice energy of $\text{CsBr}_{(s)}$

5. Write Lewis structures for the simplest covalent molecules formed by the following atoms, assuming that the octet rule (duet rule for hydrogen) is followed in each case.

- a. P and H b. C and F

6. Write plausible Lewis structures for the following covalent molecules:

- a. CH_3OH b. CH_2O c. NH_2OH d. N_2H_4 e. COF_2 f. PCl_3

7. Without referring to figures or tables in the text (other than the periodic table), arrange each of the following sets of atoms in their expected order of increasing electronegativity.

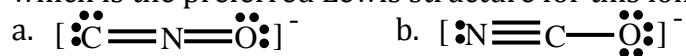
- a. B, F, N b. As, Br, Ca c. C, O, Ga

8. Use differences in electronegativity values to arrange each of the following sets of bonds in order of increasing polarity. Use the symbols δ^+ and δ^- to indicate partial charges, if any, in the bonds.

- a. Cl – F, F – F, Br – F, H – F, I – F

- b. H – Br, H – Cl, H – F, H – H, H – I

9. Assign formal charges to each atom in the following structures. Based on these formal charges, which is the preferred Lewis structure for this ion, the cyanate ion?



10. Write Lewis structures for a) nitrous acid and b) nitric acid. In which of these substances is resonance more important? Explain.

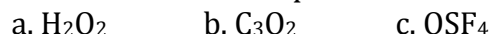
11. Write the simplest Lewis structure for each of the following. Comment on any unusual features of the structures.



12. Predict the molecular geometry of each of the following.



13. Describe the shape of each of the following.



14. Which of the molecules, H₂O or OF₂, would you expect to have the larger dipole moment? Explain.

15. Draw structural formulas and use crossed arrows to represent bond dipoles and any resultant molecular dipole in molecules of



16. Estimate bond lengths for the following bonds using atomic radii values. Do you think your estimate is likely to be too high or too low? Compare your answers with published bond lengths for these combinations.



17. Using bond energies, estimate the enthalpy change (ΔH) for the reaction

